



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/788,339	02/21/2001	Sadaji Tsuge	P107336-00018	1063

7590 07/16/2002

AREN'T FOX KINTNER PLOTKIN & KAHN, PLLC  
Suite 600  
1050 Connecticut Avenue, N.W.  
Washington, DC 20036-5339

EXAMINER

MUTSCHLER, BRIAN L

ART UNIT

PAPER NUMBER

1753

DATE MAILED: 07/16/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/788,339	<b>Applicant(s)</b> TSUGE, SADAJI
	<b>Examiner</b> Brian L. Mutschler	<b>Art Unit</b> 1753
<i>-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --</i>		
<b>Period for Reply</b>		
<b>A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.</b>		
<ul style="list-style-type: none"> <li>- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.</li> <li>- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.</li> <li>- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.</li> <li>- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).</li> <li>- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).</li> </ul>		
<b>Status</b>		
1) <input checked="" type="checkbox"/> Responsive to communication(s) filed on <u>12 June 2002</u> .		
2a) <input checked="" type="checkbox"/> This action is FINAL.                    2b) <input type="checkbox"/> This action is non-final.		
3) <input type="checkbox"/> Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under <i>Ex parte Quayle</i> , 1935 C.D. 11, 453 O.G. 213.		
<b>Disposition of Claims</b>		
4) <input checked="" type="checkbox"/> Claim(s) <u>1-9</u> is/are pending in the application.		
4a) Of the above claim(s) _____ is/are withdrawn from consideration.		
5) <input type="checkbox"/> Claim(s) _____ is/are allowed.		
6) <input checked="" type="checkbox"/> Claim(s) <u>1-9</u> is/are rejected.		
7) <input type="checkbox"/> Claim(s) _____ is/are objected to.		
8) <input type="checkbox"/> Claim(s) _____ are subject to restriction and/or election requirement.		
<b>Application Papers</b>		
9) <input checked="" type="checkbox"/> The specification is objected to by the Examiner.		
10) <input type="checkbox"/> The drawing(s) filed on _____ is/are: a) <input type="checkbox"/> accepted or b) <input type="checkbox"/> objected to by the Examiner.		
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).		
11) <input checked="" type="checkbox"/> The proposed drawing correction filed on <u>12 June 2002</u> is: a) <input checked="" type="checkbox"/> approved b) <input type="checkbox"/> disapproved by the Examiner.		
If approved, corrected drawings are required in reply to this Office action.		
12) <input type="checkbox"/> The oath or declaration is objected to by the Examiner.		
<b>Priority under 35 U.S.C. §§ 119 and 120</b>		
13) <input type="checkbox"/> Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).		
a) <input type="checkbox"/> All b) <input type="checkbox"/> Some * c) <input type="checkbox"/> None of:		
1. <input type="checkbox"/> Certified copies of the priority documents have been received.		
2. <input type="checkbox"/> Certified copies of the priority documents have been received in Application No. _____.		
3. <input type="checkbox"/> Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).		
* See the attached detailed Office action for a list of the certified copies not received.		
14) <input type="checkbox"/> Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).		
a) <input type="checkbox"/> The translation of the foreign language provisional application has been received.		
15) <input type="checkbox"/> Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.		
<b>Attachment(s)</b>		
1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)		
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)		
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.		
4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s) _____.		
5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)		
6) <input type="checkbox"/> Other: _____.		

## DETAILED ACTION

### ***Comments***

1. In response to the objection to the specification on page 12 at line 15 and in lines 19-20, Applicant has submitted two different paragraphs to correct the errors included in a single paragraph. It is requested that Applicant submits a single paragraph to correct the errors. The remaining objections to the specification have been met by Applicant's amendment.
2. The objections to claims 1, 2 and 8 have been met by Applicant's amendment.
3. The rejection to claim 6 under 35 U.S.C. 112 (2<sup>nd</sup> par.) has been overcome by Applicant's amendment.
4. The provisional obviousness type double patenting rejection and provisional rejection under 35 U.S.C. 103(a) over copending Application No. 09/772,994 has been overcome by Applicant's amendment to the instant claims, which distinguish the claims over the claims of the copending application by requiring a crystalline silicon substrate.
5. The rejections of claims 1-9 under 35 U.S.C. 102 and 35 U.S.C. 103 using Yamagishi et al. have been overcome by Applicant's amendment to the claims. Claim 1 of the instant invention now recites a crystalline silicon substrate for the solar cells. While Yamagishi et al. do disclose the use of crystalline silicon in the solar cell elements, the solar cell elements do not provide support for themselves in the manner implied by the term "substrate". In other words, the solar cell elements of Yamagishi et al. are designed to be supported by a substrate that is not part of the semiconductor layers.

***Drawings***

6. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on June 12, 2002 has been accepted. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

***Specification***

7. The disclosure is objected to because of the following informalities:

- a. In the amendment to page 11, line 20, it is suggested that "Iridium Tin Oxide" should be changed to "Indium Tin Oxide";
- b. On page 12, line 15, the reference character "5" should be inserted after "elements";
- c. On page 12, line 15, "the" should be inserted after "position"; and
- d. On page 12, lines 19-20, "forming semiconductor junction on the side of the rear surface film 2 is positioned" should be changed to "forming a semiconductor junction is positioned on the side of the rear surface film 2".

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1 and 2 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is indefinite because it claims "the solar cell element has the semiconductor junction positioned at the crystalline silicon substrate on an opposite side of the front surface side light transmitting member" (claim 1, lines 7-9). The claim does not describe what the "opposite side" is referring to, e.g. the side of the front surface member upon which light is incident or the side opposite the light incident side.

Claim 2 does not define how the solar cell element is structured so that light enters from a side opposite of the junction. The claimed solar cell element only has two layers, so the junction will always be in the center of the element. Therefore, it is not clear how light enters on a side opposite the junction.

For the purpose of examination, the examiner made the following assumptions:

a. In claim 1, the semiconductor junction was assumed to be formed on the opposite side of the front surface light transmitting member as the incoming light, as shown in figures 1 and 2 of the instant invention.

### ***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 1-5, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanoka et al. (U.S. Pat. No. 6,353,042) in view of Yamagishi et al. (U.S. Pat. No. 6,300,556) and in view of Asano et al. (U.S. Pat. No. 5,456,764).

Hanoka et al. disclose a solar cell module having a plurality of solar cells **22** encapsulated within a sealing material **10** (fig. 2). A front surface light transmitting member **26** is made of glass, and a rear surface member **28** is made of glass or a resin, such as Tedlar™, a transparent film (col. 5, line 65 to col. 6, line 9). A transparent film would allow light to enter from both sides of the solar cell. The solar cells **22** may comprise crystalline or amorphous material and may be made of silicon or one of several other semiconductor materials (col. 1, lines 31-35; col. 6, lines 19-59).

The solar cell module disclosed by Hanoka et al. differs from the instant invention because Hanoka et al. do not disclose the following:

- a. The front surface member containing sodium, as recited in claim 1;
- b. The solar cell having a crystalline silicon substrate, as recited in claim 1;  
and
- c. The solar cell element includes a heterojunction between a crystalline semiconductor and an amorphous semiconductor, as recited in claim 8.

Regarding claim 1, Yamagishi et al. disclose the use of soda lime glass, which contains sodium, as a surface member (col. 7, line 29).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solar cell module of Hanoka et al. to use soda

lime glass as the front surface member, as taught by Yamagishi et al., because soda lime glass is very inexpensive and provides excellent weather resistance.

Regarding claims 1 and 8, Asano et al. disclose a solar cell having a p-type crystalline substrate **1** and an n-type amorphous silicon layer **2** forming a heterojunction (col. 3, line 58).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the solar cell module of Hanoka et al. to use a crystalline silicon substrate and an amorphous layer forming a heterojunction, as taught by Asano et al., because using a crystalline silicon substrate would provide structural support for the solar cell while increasing the photoelectric conversion efficiency through the use of crystalline material, and the formation of an amorphous layer on the substrate would simplify the construction of the solar cell because amorphous silicon is easier and less expensive to manufacture than crystalline silicon.

12. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hanoka et al. (U.S. Pat. No. 6,353,042) in view of Yamagishi et al. (U.S. Pat. No. 6,300,556) and in view of Asano et al. (U.S. Pat. No. 5,456,764), as applied above to claims 1-5, 7 and 8, and further in view of Matsushita et al. (U.S. Pat. No. 6,222,118).

Hanoka et al., Yamagishi et al. and Asano et al. describe a solar cell module having the limitations of claims 1-5, 7 and 8 of the instant invention, as explained above

in paragraph 11. However, they do not disclose the use of single crystalline silicon solar cell elements as claimed in the instant invention.

Matsushita et al. teach the use of single crystalline silicon solar cell elements (col. 4, line 53). Matsushita et al. also teach that polycrystalline silicon, amorphous silicon, or combinations of both can equally be used in solar cell elements (col. 8, line 63).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have made the solar cell modules described by Hanoka et al., Yamagishi et al. and Asano et al. to use a single crystalline silicon layer because single crystalline layers, amorphous layers and polycrystalline layers are equally usable in solar cell modules, as taught by Matsushita et al. (col. 8, line 63).

#### ***Response to Arguments***

13. Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection. Since the claims were amended to include a crystalline substrate, new grounds of rejection were required.

#### ***Conclusion***

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian L. Mutschler whose telephone number is (703) 305-0180. The examiner can normally be reached on Monday-Friday from 8:00am to 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (703) 308-3322. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

blm  
July 1, 2002

  
NAM NGUYEN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700